

ITU-R Standards Activities

Outputs

- Measurements performed to determine how measured levels of radar unwanted emissions vary as a function of receiver bandwidth.
- Presentations at meeting in London, UK of WP 8B International Radar Correspondence Group to consider new limits and measurement techniques for assessment of radar spurious emissions.
- Comparative measurements of radar spurious emissions performed by ITS at a laboratory in the UK for validation of the technique given in a Study Group 8 Draft New Recommendation.
- Ongoing technical support to the U.S. Administration in its investigation of advanced technologies for sharing radio spectrum between radars and short-range wireless communication devices at microwave frequencies.
- ITS-developed measurement method for broadcast television video quality, included in a Preliminary Draft New ITU-R Recommendation as a normative technique to be used internationally.

Success in worldwide telecommunications markets, as well as successful and compatible use of telecommunications technologies both domestically and abroad, is critical to the long-term success of the United States in many spheres. To achieve these goals, the U.S. Administration participates in a worldwide telecommunications standards and regulatory body, the International Telecommunication Union — Radiocommunication Sector (ITU-R), to further its objectives with regard to all forms of wireless communications on a worldwide basis. ITS in turn provides important, ongoing technical support for the U.S. Administration in several ITU-R Study Groups and Working Parties. Current areas of interest include (but are not limited to): improved methods for assessing spectrum impacts of high-power radars; advanced spectrum sharing technologies between wireless communication devices and radars; and video and audio quality-assessment technologies.

To support improved spectrum efficiency for both the private sector and governments, ITS engineers have performed ongoing technical work to assess and improve spectrum emissions from high-power radars and to pass their work to the international community in ITU-R Working Party 8B (WP 8B). In FY 2003, this work involved a series of measurements on emissions from a high-power radar at the ITS Table Mountain research facility. The spectrum measurements were used first of all to determine how the measured levels of unwanted emissions depended upon the selection of measurement bandwidth, an important consideration in the development of radar emission level masks both domestically and abroad. The results showed that measured unwanted emission levels varied at the rate of about $16\log(\text{bandwidth})$, as contrasted with the well-known $20\log$ variation measured at the radar fundamental frequency. Secondly, the measurements demonstrated that spectrum measurements performed at half the far-field distance of the radar antenna were nearly identical to results obtained in the far field of the same antenna. All these results were presented at a meeting of the WP-8B Radar Correspondence Group (RCG) in London, UK in June. They are available on-line at <http://www.its.bldrdoc.gov/meetings/rcg/contributions.html>. Following that meeting, engineers from ITS and NTIA's Office of Spectrum Management (OSM) engineers performed system development measurements at a facility near Portsmouth, UK.

Finally, a number of proposals have been made by non-U.S. Administrations in ITU-R to introduce communication systems into bands that have heretofore been allocated for radars on a primary basis. Since the U.S. Administration has made an enormous investment in the development and deployment of both military and civilian radars, it is essential that new systems proposed for spectrum sharing with radars be shown to be electromagnetically compatible with existing and future radars. To this end, ITS engineers in FY 2003 prepared to test the new technology, called dynamic frequency selection (DFS) for the U.S. Administration.

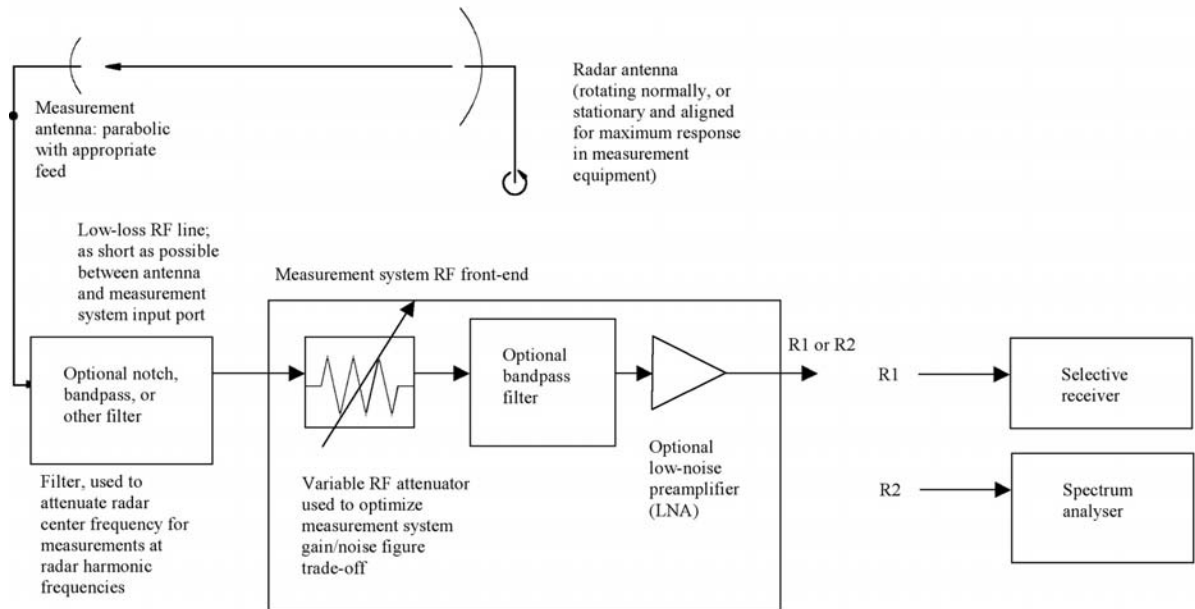


Diagram from ITU-R Study Group 8 Draft New Recommendation M.1177-2, showing ITS-designed radar spectrum measurement system that has been adopted internationally for radar emission measurements.

DFS has never been implemented operationally and presents a number of difficult, unsolved technical problems. In FY 2003, ITS and OSM engineers developed a test procedure to assess the performance of prototype DFS devices operating near 5 GHz. Initial tests will be performed early in FY 2004, and results quantifying DFS effectiveness are expected to be provided in a number of forums including the ITU-R later in FY 2004.

In FY 2003, a video quality measurement system developed by ITS engineers was made a normative worldwide measurement method in a new ITU-R WP 6Q Preliminary Draft New Recommendation (PDNR). In ITU-R Working Party 6Q (WP 6Q), this technique was included in the PDNR along with other U.S. contributions defining the scope, purpose, and application of the PDNR. Further information about this work can be found in the ITU-T section of this technical progress report (pp. 64-65).

Recent Publications

ITU-R WP-8B Radar Correspondence Group (RCG) document RCG-14, "Variation in measured levels of OOB and spurious emissions with measurement bandwidth."

ITU-R WP-8B RCG document RCG-15, "Near-field and far-field spectrum measurements on a maritime radar."

(Both WP-8B documents are available at <http://www.its.bldrdoc.gov/meetings/rcg/contributions.html>)

ITU-R SG-8 Draft New Recommendation M.1177-2, "Techniques for measurement of unwanted emissions from radar systems."

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